

WHAT IS CLAIMED IS:

- 1                   1.       A shielded printed circuit board (PCB) comprising:  
2                   a PCB comprising a first surface and a second surface;  
3                   a metallized polymer shield coupled to the first surface of the PCB;  
4                   a grounded layer coupled to the second surface of the PCB; and  
5                   a plurality of conductive vias that extend from the first surface to the grounded  
6 layer so as to electrically couple the metallized polymer shield to the grounded layer.
- 1                   2.       The shielded PCB of claim 1 comprising an electronic component  
2 mounted to the first surface of the PCB, wherein adjacent conductive vias are spaced within  
3 the PCB a distance that is small enough to reduce a passage of electromagnetic radiation from  
4 the electronic component through the spacing between the adjacent conductive vias.
- 1                   3.       The shielded PCB of claim 1 comprising an electronic component  
2 mounted to the first surface of the PCB, wherein the plurality of conductive vias, grounded  
3 layer, and metallized polymer shield forms a three dimensional grounded EMI shield that  
4 substantially envelopes the electronic component.
- 1                   4.       The shielded PCB of claim 1 wherein the metallized polymer shield is  
2 removably coupled to the first surface of the PCB.
- 1                   5.       The shielded PCB of claim 4 wherein the metallized polymer shield is  
2 coupled to the vias through a conductive element.
- 1                   6.       The shielded PCB of claim 5 wherein the conductive element  
2 comprises a conductive adhesive.
- 1                   7.       The shielded PCB of claim 4 wherein the metallized polymer shield is  
2 coupled to the vias through a mechanical connector.
- 1                   8.       The shielded PCB of claim 1 wherein the PCB comprises two or more  
2 layers, wherein the second surface is between two adjacent layers of the PCB.
- 1                   9.       The shielded PCB of claim 1 wherein the second surface is an external,  
2 bottom surface of the PCB.

1                   10.     The shielded PCB of claim 1 wherein the grounded layer comprises a  
2 ground plane.

1                   11.     The shielded PCB of claim 1 wherein the grounded layer is electrically  
2 coupled to a ground plane.

1                   12.     The shielded PCB of claim 1 wherein the metallized polymer shield  
2 comprises:

3                   a shaped polymer substrate that provides a cavity that is sized and shaped to  
4 receive an electronic component, wherein the shaped polymer substrate comprises a flange  
5 that extends around at least a portion of a perimeter of the cavity in a direction that is  
6 substantially parallel to the first surface of the PCB; and

7                   a metal layer disposed over at least one surface of the shaped polymer  
8 substrate.

1                   13.     The shielded PCB of claim 1 wherein the flange of the metallized  
2 polymer shield comprises a plurality of openings.

1                   14.     An electronic device comprising the PCB of claim 1.

1                   15.     A printed circuit board comprising:

2                   a multi-layered substrate that comprises a first external surface and a second  
3 external surface, wherein a portion of the first external surface is configured to receive an  
4 electronic component;

5                   one or more internal grounded layers disposed between adjacent layers of the  
6 multi-layered substrate;

7                   a network of conductive elements that extend through at least a portion of the  
8 multi-layered substrate, wherein the electrically conductive elements extend from at least one  
9 of the internal grounded planes to the first external surface; and

10                  a shield coupled to the first surface, the shield electrically coupled to at least  
11 some of the conductive elements to provide an electrical grounding connection between the  
12 shield and the one or more internal grounded planes.

1                   16.     The printed circuit board of claim 15 wherein the network of  
2 conductive elements comprises a plurality of conductively coated or filled vias.

1                    17.     The printed circuit board of claim 15 further comprising a grounding  
2 trace on the first external surface that substantially surrounds the portion of the first external  
3 surface that is configured to receive an electronic component.

1                    18.     The printed circuit board of claim 15 wherein spaces between adjacent  
2 conductive elements comprise a largest dimension that is small enough to substantially  
3 reduce emission of electromagnetic radiation from the electronic component.

1                    19.     The printed circuit board of claim 18 wherein the largest dimension is  
2 smaller than half a wavelength of EMI emissions from the electronic component.

1                    20.     The printed circuit board of claim 15 wherein the first surface  
2 comprises at least one mechanical connector that electrically couples a conductive portion of  
3 the shield to the network of conductive elements.

1                    21.     The printed circuit board of claim 20 wherein the mechanical  
2 connector comprises a conductive or nonconductive adhesive.

1                    22.     The printed circuit board of claim 20 wherein the mechanical  
2 connector comprises a groove in the first surface, wherein the groove is sized to receive a  
3 portion of an EMI shield.

1                    23.     The printed circuit board of claim 15 wherein the shield comprises a  
2 metal can.

1                    24.     The printed circuit board of claim 15 wherein the shield comprises a  
2 shaped polymer layer and a metal layer.

1                    25.     The printed circuit board of claim 15 wherein the shield is coupled to a  
2 ground trace positioned on the first external surface, wherein the ground trace is in electrical  
3 communication with at least some of the conductive elements.

1                    26.     The printed circuit board of claim 15 wherein the conductive elements  
2 make direct contact with a flange of the shield.

1                    27.     The printed circuit board of claim 26 wherein a conductive element is  
2 disposed on a portion of the conductive elements o create an electrical connection to the  
3 shield positioned on the first external surface.

1                    28.     The printed circuit board of claim 26 wherein the conductive element  
2 comprises conductive adhesive.

1                    29.     An electronic device comprising the PCB of claim 15.

1                    30.     A method of shielding an electronic component on a printed circuit  
2 board (PCB), the method comprising:

3                    providing a PCB that comprises an electronic component on a first surface of  
4 the PCB and one or more grounded layers, and a plurality of conductive vias that extend from  
5 the first surface to at least one of the grounded layers; and

6                    coupling a metallized polymer shield to the first surface of the PCB and  
7 around the electronic component to create an electrical connection to the conductive vias and  
8 the grounded layer(s),

9                    wherein the electrical connection between the grounded layer(s), vias, and the  
10 metallized polymer shield forms a grounded EMI shield that substantially surrounds the  
11 electronic component.

1                    31.     The method of claim 30 comprising placing the PCB in a housing of an  
2 electronic device.

1                    32.     The method of claim 30 wherein the metallized polymer shield is  
2 removably coupled to the first surface of the PCB.

1                    33.     The method of claim 30 wherein the metallized polymer shield is  
2 coupled to the conductive vias through a ground trace on the first surface of the PCB.

1                    34.     The method of claim 30 comprising positioning a conductive adhesive  
2 between the metallized polymer shield and the first surface before the metallized polymer  
3 shield is coupled to the first surface of the PCB.

1                    35.     The method of claim 30 further comprising creating openings in a  
2 flange of the metallized polymer shield that correspond to the position of the vias on the  
3 PCB; and  
4                    placing a conductive element over the openings to create a conductive path  
5 between a metal layer on the metallized polymer shield and the vias.

1                    36.     The method of claim 30 wherein providing a PCB comprises forming  
2 the vias in the PCB,  
3                    wherein the vias are conductively coated or filled and are in a spaced  
4 configuration that has a largest distance between an adjacent via that is smaller than half a  
5 wavelength of the electromagnetic radiation that is emitted from the electronic component.

1                    37.     The method of claim 30 wherein at least one of the grounded layers  
2 comprises a ground plane.

1                    38.     The method of claim 30 wherein providing a PCB comprises forming a  
2 groove in the first surface of the PCB.